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Growth and Yield Impacts of Organic Manure and Pruning on Dragon Fruit (*Hylocereus undatus* Haw.)

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Abstract: Dragon is an intensively cultivated fruit crop and its yield is directly influenced by organic manures and lateral branching. So, an experiment was carried out to examine the effects of organic manures and lateral branches pruning on the growth and yield of dragon fruit at the BAU Germplasm Centre of Bangladesh Agricultural University, Mymensingh during the period from March to November, 2022. The experiment consisted of five doses of organic manures, viz. 10.00 kg hill^{-1} , cow dung, 20.00 kg hill^{-1} cow dung, 30.00 kg hill^{-1} cow dung, 40.00 kg hill^{-1} cow dung and control (no cow dung). There were three types of lateral branches pruning, viz. primary lateral branch pruning, secondary lateral branch pruning and control (no lateral branch pruning). The two-factor experiment was laid out in the RCBD with three replications. The highest plant height (3.70 m), number of branches hill^{-1} (18.00), number of flowers hill^{-1} (20.26), number of fruits hill^{-1} (17.91) and yield (4.84 t ha^{-1}) were obtained from cow dung at 30.00 kg hill^{-1}. In case of primary lateral branch pruning condition, the highest plant height (3.14 m), number of branches hill^{-1} (14.52), number of flowers hill^{-1} (15.52), number of fruits hill^{-1} (14.13) and yield (3.04 t ha^{-1}) were observed. When combined effect was considered the highest plant height (3.87 m), number of branches hill^{-1} (23.00), number of flowers hill^{-1} (22.20), number of fruits hill^{-1} (20.13) and yield (5.26 t ha^{-1}) were obtained from 30.00 kg cow dung with primary lateral branch pruning. When combined effects were considered, the highest yield (5.26 t ha^{-1}) was obtained from 30.00 kg cow dung with primary lateral branches pruning. The lowest values of all the parameters were recorded in the control treatment. The findings of this experiment demonstrated a significant impact of organic manure and lateral branch trimming on the development and production of dragon fruit. Application of 30,00kg cow dung hill^{-1} with primary lateral branches pruning appears to be a promising combination for producing maximum yield (5.26 t ha^{-1}) of dragon fruit in Bangladesh.

Keywords: Organic manure; Pruning; Yield; Dragon fruit.

INTRODUCTION

Dragon fruit (*Hylocereus* spp.) belongs to the family (Cactaceae) is a climbing vine cactus used both as a fruit crop and an aesthetic plant. Dragon fruit is native to Central America, Mexico, and South American. There are three species being grown as they are referred normally white fleshed (*Hylocereus undatus*), red or purple fleshed (*Hylocereus costaricensis and Hylocereus polyrhizus*) and yellow fleshed named *Selenicereus megalanthus* (Mizrahi *et al.*, 2004). People with diabetes, high blood pressure, and obesity have attested to the goodness of the dragon fruit,

which is the most nutrient-dense fruit. As the nutritional and economic value is very high, so the cultivation of Dragon fruit is suitable in our country. Organic manures are derived from animal or plant source. They are bulky and comprise farmyard manure, compost and green manure. They are excellent sources of organic matter, but relatively low in nutrients. Due to their low nutritional content, organic manure must be applied at very high rates (20–40 t ha^{-1}) in order to offer enough humus to noticeably improve the physical condition of the soil (Mathew and Karikari, 1995). Organic manure in addition to nutrients value, increases the soil's organic matter and provides benefits such as increased cation exchanged capacity to nutrient retention. Because dragon fruit needs a warm environment, it grows well in semi-arid regions. (Feng-Ru and Chum-Rubey, 1997a; 1997b). Application of organic manures with chemical and biofertilizers will produce better yield than any solo treatment (Verma *et al.*, 2019). It is also well known that organic manure and irrigation improve the enhanced soil physiochemistry and biology results in improved soil characteristics (Pushpakumara *et al.*, 2005). To have a successful and prolific plantation, it needs a tropical climate, especially when growing for commercial purposes. The French are thought to have brought the fruit to Vietnam, where today's average production per hectare is 20–25 tons. Therefore, the experiment was conducted to find out the effects of organic manures (cow dung) and lateral branch pruning on growth and yield of dragon fruit.

MATERIALS AND METHODS

Study Location

From March to November 2022, the experiment was carried out at the BAU Germplasm Centre (GPC). The location was 18 in. above sea level and between latitudes 24.6°N and 90.5°E. The Old Brahmaputra Flood Plain Alluvial Tract's sandy loam soil type makes up the soil in the trial area (Table 1).

Climatic Condition

The experimental area experienced a subtropical climate with substantial rainfall from March to November 2022 and little rainfall from December to February 2023. 2172 mm of rain fell in the area overall between April and October of 2022. 28.9°C and 23.45°C on average, respectively, were the maximum and lowest temperatures. The average sunlight hours were 379.48 and the average relative humidity was 65.75% (Table 2).

Experimental design and Data Collection

The plants were established by cuttings and planted in August, 2014. Ages of the plant were 2 years and 7 months. The variety used was BAU dragon fruit-1. The experiment consisted of two factors i.e., Factor A: Organic manures: M0 = Control (no cow dung), M1 = 10 kg $hill^{-1}$ cow dung, M2 = 20kg $hill^{-1}$ cow dung, M3 = 30 kg $hill^{-1}$ cow dung, M4 = 40 kg $hill^{-1}$ cow dung; Factor B: Pruning: P0 = Control (no pruning), P1 = Primary lateral branch pruning, P2 = Secondary lateral branch pruning. The experiment was conducted by the RCBD design with three replications. Each block contained 15 hills and each hill contained 3 plants Total number of plants was 135. The distances between hill to hill and row to row were 4m and 3.5 m respectively. Treatments were randomly assigned to the plots of each block. Different doses of manures applied and primary and secondary lateral branched were pruned on 5 March, 2022 as per treatment of the experiment.

Table 1: Physio-chemical characteristics of the initial soil (0-15 cm depth)

% sand (0.2-.02 mm)	:	20
% silt (.02-.002 mm)	:	67
% clay (<.002 mm)	:	13
Textural class	:	Silt loam
PH	:	6.20
OM (%)	:	1.67
Total N (%)	:	0.10
Available P (ppm)	:	26.00
Exchangeable K (me %)	:	0.14
Available S (ppm)	:	13.90

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Table 2: Weather parameters of experimental period of dragon fruit growing season (March 2022 to November 2022)

Months	Air temperature (^{0}C)			Average RH (%)	Average rainfall (mm)	Sunshine (hrs)
	Max.	Min.	Avg.			
Apr.	33.4	22.3	27.85	46	110	360
May	32.1	23.7	27.9	61	286	409.2
June	31.6	25	28.3	75	469	I. 402
July	31.2	25.8	28.5	74	401	II. 412.3
Aug.	31.8	26	28.9	75	398	III. 403
Sep.	31.1	25.5	28.3	72	311	IV. 366
Oct.	30.8	23.6	27.2	68	179	353.4
Nov.	28.7	18.2	23.45	55	18	330

Statistical analysis

Using the MSTAT package tool, the recorded data was statistically evaluated to determine the variation brought on by the experimental treatment. The mean for each treatment was computed, and the F variance test was used to analyze the variances of the parameters under study at 5% levels of significance. By using the least significant difference test (LSD), the parameter means were compared (Gomez and Gomez, 1984).

RESULTS AND DISCUSSION

Plant height

The height of the plant varied significantly due to application of various doses of organic manure. Among the organic manure treatments, the highest plant height (3.70 m) was obtained from the dose of 30.0 kg plant^{-1} organic manure at 180 DAM followed by the doses of organic manures (Table 3). The highest plant height was noted during the growing season (3.14 m) in primary lateral branches pruning at 180 day (Table 4). Among the combined treatment of cow dung and lateral branches pruning, the highest plant height (3.87 m) was obtained from the dose of 30.0 kg hill^{-1} with primary lateral branches pruning at 180 DAM (Table 7). This result agreed with the findings of (Tri *et al.*, 2000). Maximum plant height was obtained from the dose of 30.0 kg hill^{-1} with primary lateral branches pruning. This is in agreement with the reports of (Zee *et al.*, 2004).

Table 3: Effects of organic manures on plant height

Manures	Plant height (cm)						
	10 DAM	30 DAM	60 DAM	90 DAM	120 DAM	150 DAM	180 DAM
M0	1.15	1.67	1.91	2.07	2.16	2.17	2.19
M1	1.48	1.81	2.15	2.23	2.26	2.29	2.43
M2	1.70	2.20	2.37	2.48	2.49	2.61	2.70
M3	2.13	2.61	3.37	3.41	3.61	3.64	3.70
M4	1.92	2.46	2.76	2.91	2.95	2.98	3.00
LSD0.05	0.043	0.053	0.031	0.068	0.061	0.061	0.068

DAM= Days after manuring

Table 4: Effects of lateral branches pruning on plant height

Pruning	Plant height (cm)						
	10 DAM	30 DAM	60 DAM	90 DAM	120 DAM	150 DAM	180 DAM
P0	1.45	1.95	2.24	2.39	2.53	2.56	2.58
P1	1.93	2.35	2.80	2.90	2.95	3.03	3.14
P2	1.64	2.15	2.49	2.56	2.60	2.63	2.69
LSD0.05	0.033	0.041	0.024	0.053	0.047	0.047	0.053

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Number of branches hill^{-1}

Among the organic manures treatment, the highest number of branches (18.00) was obtained from the dose of 30.0 kg hill^{-1} of cow dung at 120 DAM (Table 5). During the period, the highest of branches was observed (14.59) in primary lateral branches pruning at 120 days (Table 6). Their combined effect also influenced highly significantly. Among combined treatments of manure and lateral branch pruning, the highest number of branches (23.00) was obtained from the dose of 30.0 kg hill^{-1} cow dung with primary lateral branches pruning at 120 DAM (Table 7). The differences in number of branches hill^{-1} in these treatments might be due to the variation in the environmental conditions. This agrees with the reports of (Ke, 1997).

Table 5. Effects of manure on number of branches per hill of dragon fruit

	No. of branch/hill				
Manure	Initial	30 DAM	60 DAM	90 DAM	120 DAM
M0	2.46	2.89	4.44	6.33	6.55
M1	3.66	4.11	5.44	7.33	8.11
M2	3.88	4.77	5.88	8.33	9.21
M3	11.00	13.22	15.11	17.11	18.00
M4	6.66	8.11	9.44	11.55	12.11
LSD0.05	0.290	0.319	0.368	0.212	0.391

Table 6. Effects of lateral branches pruning on number of branches per hill of dragon fruit

	No. of branch/plant				
Pruning	Initial	30 DAM	60 DAM	90 DAM	120 DAM
P0	4.06	4.46	5.46	6.80	7.53
P1	6.75	8.53	10.66	13.73	14.59
P2	5.79	6.86	8.06	9.86	10.26
LSD0.05	0.225	0.247	0.285	0.164	0.303

Table 7. Combined effect of manures and pruning on plant height and number of branches of dragon fruit

Pruning x manures	Plant height (cm)							No. of branch/plant				
	Initial	30	60	90	120	150	180	Initial	30	60	90	120
		DAM							DAM			
P0M0	1.04	1.28	1.55	1.71	1.78	1.78	1.80	2.30	2.67	4.00	5.33	5.33
P0M1	1.28	1.62	1.83	2.00	2.04	2.06	2.12	3.00	3.00	4.67	6.67	7.00
P0M2	1.38	2.03	2.14	2.25	2.37	2.46	2.50	3.00	4.00	5.00	7.00	7.33
P0M3	1.91	2.52	2.97	3.13	3.57	3.60	3.61	6.67	7.00	7.67	8.00	10.00
P0M4	1.68	2.31	2.72	2.87	2.90	2.91	2.91	5.33	5.67	6.00	7.00	8.00
P1M0	1.27	2.00	2.24	2.47	2.65	2.66	2.66	2.76	3.00	5.00	8.33	8.33
P1M1	1.78	2.01	2.58	2.62	2.69	2.72	2.92	4.67	5.33	7.00	8.33	10.00
P1M2	2.05	2.41	2.73	2.88	2.72	2.90	3.07	5.33	6.00	7.33	10.67	12.33
P1M3	2.40	2.75	3.62	3.57	3.66	3.73	3.87	13.33	16.67	19.67	22.67	23.00
P1M4	2.17	2.60	2.84	3.00	3.07	3.14	3.18	7.67	11.67	14.33	18.67	19.33
P2M0	1.16	1.73	1.96	2.03	2.06	2.08	2.12	2.33	3.00	4.33	5.33	6.00
P2M1	1.38	1.82	2.05	2.07	2.07	2.10	2.26	3.33	4.00	4.67	7.00	7.33
P2M2	1.69	2.18	2.24	2.32	2.40	2.49	2.54	3.33	4.33	5.33	7.33	8.00
P2M3	2.10	2.56	3.52	3.53	3.60	3.60	3.64	13.00	16.00	18.00	20.67	21.00
P2M4	1.91	2.47	2.72	2.87	2.90	2.91	2.91	7.00	7.00	8.00	9.00	9.00
LSD0.05	0.07	0.09	0.05	0.11	0.10	0.10	0.11	0.50	0.55	0.64	0.36	0.68

Time of flower bud initiation to fruit maturity

It is reported that time of flowering to fruit maturity significant influence of application of different dose of organic manures and lateral branches pruning. In case of cow dung lowest time of flowering to fruit maturity (45.88 days) was found with 30.00 kg hill^{-1} (Table 8) and lowest time of flowering to fruit maturity (47.86 days) was obtained from the treatment of primary lateral branches

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pruning (Table 9). The interaction effect of organic manures and lateral branches pruning on time of flowering to fruit maturity was found to be significant. The minimum time of flowering to fruit maturity (45.33days) was attained with the combination of treatments of 30.00 kg cow dung and primary lateral branches pruning (Table 10). In the case time of flowering to fruit maturity depends on the temperatures rises beyond with optimal point (Luders, 2004).

Numbers of flowers per hills

Among the organic manure treatments, the highest number of flowers hill^{-1} (20.26) was found with the dose of cow dung 30.00 kg hill^{-1} (Table 8). This agrees with the reports of (Pushpakumara et al., 2005). In case of number of flowers hill^{-1} the higher number of flowers hill^{-1} (15.52) was found in primary lateral branches pruning (Table 9). The maximum number of flowers hill^{-1} (22.20) was obtained from the treatment combination of 30.00 kg cow dung with primary lateral branches pruning (Table 10).

Flowers length

Among the organic manure treatments, the highest length of flower was found with the dose of cow dung 30.00 kg hill^{-1} (29.72cm) (Table 8). In case of length of flowers, the higher length of flower hill^{-1} (27.18 cm) was found in primary lateral branches pruning (Table 9). The maximum length of flower hill^{-1} (29.83 cm) was obtained from the treatment combination of 30.00 kg cow dung with primary lateral branches pruning (Table 10).

Number of fruits per hills

The number of flowers hill^{-1} differs on the application of different dose of organic manures (Nerd *et al.*, 1999). In case of cow dung treatments, the highest number of fruits set hill^{-1} (17.91) was recorded with the dose 30.00 kg hill^{-1} (Table 8). Higher number of fruits set hill^{-1} (14.13) was recorded with primary lateral branch pruning (Table 9). The maximum number of fruits hill^{-1} (20.13) was obtained from the treatment combination of 30.00 kg cow dung with lateral branches pruning (Table 10).

Length of fruit

The highest fruit length (8.28cm) was obtained from the dose of 30.00 kg hill^{-1} of cow dung (Table 8) and fruit length (7.96 cm) was obtained from the treatment of primary lateral branches pruning (Table 9). The maximum length of fruit (9.13 cm) was obtained from the treatment combination of 30.00 kg cow dung with primary pruning (Table 10). This is in agreement with the reports of (Tri *et al.*, 2000).

Breadth of fruit

The highest fruit breadth (8.77 cm) was obtained from the dose of 30.00 kg hill-1 of cow dung (Table 8) and fruit breadth (7.37 cm) was obtained from the primary lateral branches pruning (Table 9). The maximum breadth of fruit (8.53 cm) was obtained from the treatment combination of 30.00 kg cow dung and primary lateral branches pruning (Table 10). It is supported by (Le-Van-To *et al.*, 2002).

Individual fruit weight

In case of cow dung the highest fruit weight (314.86 g) was found with 30.0 kg hill^{-1} (Table 8). It is supported by (Bashir *et al.*, 2009) and fruit weight the highest fruit weight (235.07 g) was found in primary lateral branches pruning condition (Table 9). Among the treatment combinations were also significant. The maximum weight of fruits plant^{-1} (335.07 g) was obtained from the treatment combination of 30.00 kg cow dung with primary lateral branches pruning (Table 10). It is supported by (Ram and Pathak, 2007).

Weight of pulp

Among the treatments, the highest weight of pulp (235.93 g) was observed in case of cow dung with 30.00 kg hill^{-1} (Table 8). The higher weight of pulp (157.31 g) was with primary lateral branches pruning condition (Table 9). The maximum weight of pulp (254.26 g) was obtained from the treatment combination of 30.00 kg cow dung and primary lateral branches pruning (Table 10). This agrees with the reports of (Nerd *et al.*, 1999; Pushpakumara *et al.*, 2005).

Weight of peel

In case of cow dung treatments, the highest weight of peel (78.86 g) was recorded with 30.00 kg hill^{-1} (Table 8). It is supported by (Nerd *et al.*, 1999) and higher weight of peel (72.47 g) was found with primary lateral branches pruning condition (Table 9). The variations among the treatment combinations were also significant. The maximum weight of peel (80.87 g) was obtained from the treatment combination of 30.00 kg cow dung and primary lateral branches pruning (Table 10).

Total soluble solids (TSS)

It is reported that total soluble solids (TSS) significant influence of application of different dose of organic manures and lateral branches pruning. In case of cow dung highest total soluble solids (TSS) (21.68%) was recorded with the dose of 30.00 kg hill^{-1} (Table 8). It is supported by (Le-Van-To *et al.*, 2002) and (20.31%) was obtained from the primary lateral branches pruning (Table 9). The variations among the treatment combinations were also significant. The maximum TSS (22.07%) was obtained from the treatment combination of 30.00 kg cow dung and primary lateral branches pruning (Table 10).

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Table 8: Effect of manure on time required for flower bud, no. of flower hill^{-1}, length of flower (cm), no. of fruit hill^{-1}, wt. of fruit (gm), length of fruit (cm), breath of fruit (cm), pulp weight (gm), peel weight (gm) and TSS of fruit (% brix) of dragon fruit

Manure	Time required for flower bud(days)	No. of flower hill^{-1}	Length of flower (cm)	No. of fruit hill^{-1}	Length of fruit (cm)	Breath of fruit (cm)	Wt. of fruit (gm)	Pulp weight (gm),	peel weight (gm)	TSS of fruit (% brix)
M0	50.33	10.61	24.48	8.62	6.07	6.66	113.93	44.61	56.11	17.15
M1	49.65	12.43	25.32	10.80	6.77	7.38	171.77	104.53	65.70	18.14
M2	48.77	14.11	26.98	11.35	7.20	7.80	200.35	131.02	71.56	19.27
M3	45.88	20.26	29.72	17.91	8.28	8.77	314.86	235.93	78.86	21.68
M4	48.33	15.66	28.33	14.66	7.69	8.31	231.74	154.46	76.58	20.92
LSD0.05	0.379	0.351	0.181	0.344	0.086	0.122	2.59	2.83	0.940	0.408

Table 9: Effect of pruning on time required for flower bud, no. of flower hill^{-1}, length of flower no. of fruit hill^{-1}, wt. of fruit, length of fruit, breath of fruit, pulp weight, peel weight and TSS of fruit

Pruning	Time required for flower bud(days)	No. of flower hill^{-1}	Length of flower (cm)	No. of fruit hill^{-1}	Length of fruit (cm)	Breath of fruit (cm)	Wt. of fruit (gm)	Pulp weight (gm)	peel weight (gm)	TSS of fruit (% brix)
P0	49.12	13.97	26.73	11.26	7.64	7.04	183.58	113.55	66.64	18.22
P1	47.86	15.52	27.18	14.13	7.96	7.37	235.07	157.31	72.47	20.31
P2	48.80	14.35	26.99	12.61	7.75	7.20	200.94	131.48	70.17	19.76
LSD0.05	0.294	0.272	0.140	0.267	0.095	0.067	2.01	2.19	0.728	0.316

Table 10: Combined effect of manures and pruning on time required for flower bud, no. of flower hill^{-1}, length of flower, no. of fruit hill^{-1}, wt. of fruit, length of fruit, breath of fruit, pulp weight, peel weight and TSS

Pruning	Manure	Time required for flower bud (days)	No. of flower hill^{-1}	Length of flower (cm)	No. of fruit hill^{-1}	Length of fruit (cm)	Breath of fruit (cm)	Wt. of fruit (gm)	Pulp weight (gm)	Peel weight (gm)	TSS of fruit (% brix)
	M0	50.67	9.50	24.43	8.20	6.55	5.95	87.34	33.24	54.10	15.07
	M1	50.00	11.96	24.95	8.07	7.18	6.58	156.35	84.47	62.40	16.53
P0	M2	49.33	13.53	26.83	10.53	7.74	7.14	166.70	99.43	68.67	17.80
	M3	46.33	20.20	29.59	16.13	8.49	7.89	299.80	220.01	75.98	20.97
	M4	49.33	14.70	27.85	13.40	8.26	7.66	207.74	130.59	72.07	20.77
	M0	50.00	11.35	24.55	9.00	6.84	6.27	151.60	56.41	58.67	18.73
	M1	49.00	12.73	25.59	14.60	7.61	7.01	191.43	124.83	68.10	19.00
P1	M2	48.00	15.13	27.09	11.93	7.88	7.28	237.44	165.37	74.13	20.73
	M3	45.33	22.20	29.83	20.13	9.13	8.53	335.07	254.26	80.87	22.07
	M4	47.00	16.20	28.86	15.00	8.37	7.77	259.81	185.68	80.60	21.03
	M0	50.33	11.00	24.47	8.66	6.61	6.01	102.87	44.20	55.56	17.67

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P2	M1	50.00	12.60	25.43	9.73	7.35	6.73	167.53	104.30	66.60	18.90
	M2	49.00	13.67	27.03	11.60	7.78	7.20	196.93	128.26	71.88	19.30
	M3	46.00	18.40	29.76	17.47	8.69	8.43	309.71	233.51	79.75	22.00
	M4	48.67	16.10	28.30	15.60	8.32	7.66	227.67	147.13	77.07	20.97
LSD0.05		0.659	0.610	0.314	0.599	0.212	0.150	4.51	4.92	1.634	0.709

Yield (kg hill^{-1}) of dragon fruit

The highest yield (6.74 kg hill^{-1}) was obtained from cow dung treatment with the dose of 30.00 kg hill^{-1} (Fig.1). This agrees with the reports of (Nerd *et al.*, 1999). The highest yield (4.23 kg hill^{-1}) was found with primary lateral branches pruning (Fig.2). In the combination of organic manures and lateral branches pruning significant variations were recorded in the yield hill^{-1}. The highest yield (7.23 kg hill^{-1}) was found from treatment combination of 30.00 kg cow dung with primary lateral branches pruning (Fig.3).

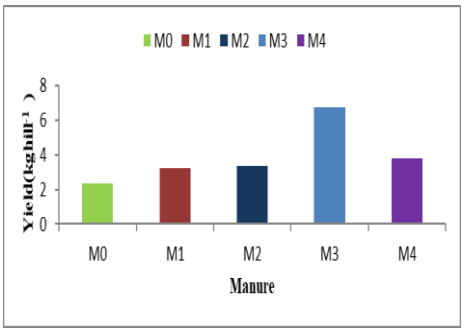

Fig. 1: Main effects of manures on yield (kg hill^{-1})

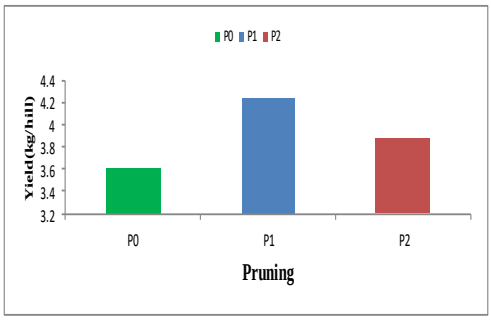

Fig. 2: Main effect of pruning on yield (kg hill^{-1})

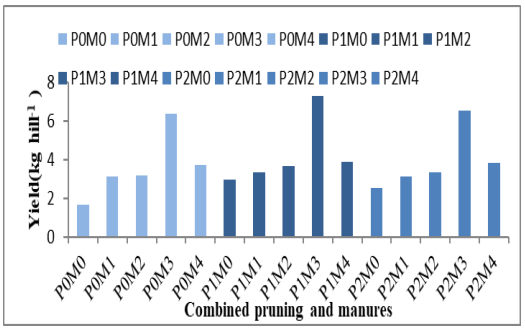

Fig. 3: Combined effects of manures and pruning on yield (kg hill^{-1})

Yield (t ha^{-1})

Application of organic manures (cow dung) was found statistically significant on the yield (t ha^{-1}) of dragon fruit. The highest yield (4.84 t ha^{-1}) was obtained from cow dung treatment with the dose of 30.00 kg hill^{-1} (Fig. 4) that agrees with Tri *et al.*, 2000. The highest yield (3.04 t ha^{-1}) was obtained from primary lateral branches pruning (Fig. 5). Due to the combined effect of manures and pruning significant variations were recorded in the yield t ha^{-1}. The highest yield (5.26 t ha^{-1}) was found from treatment combination of 30,.00 kg cow dung with primary lateral branches pruning (Fig. 6). Verma *et al.*, (2019) reported that application of organic manures with chemical and biofertilizers will produce better yield than any single treatment.

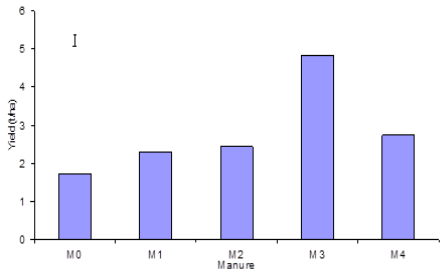

Fig. 4: Main effect of organic manures on yield (t ha^{-1})

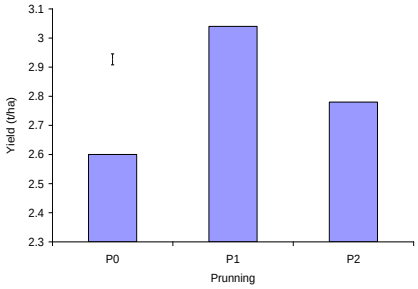

Fig. 5: Main effect of lateral branches pruning on yield (t ha^{-1})

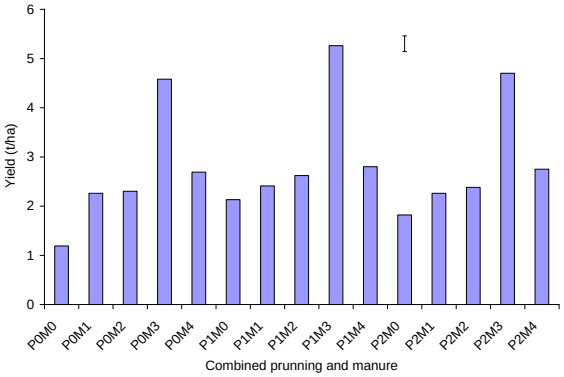

Fig. 6: Combined effects of organic manures and lateral branches pruning on yield of dragon fruit (t ha^{-1})

CONCLUSION

The findings of this investigation showed that organic manures had a significant impact on plant height, flowering and fruiting of dragon fruit with an invitation to apply cow dung at the dose of 30.00 kg hill^{-1} to get higher yield (5.26 t ha^{-1}) of dragon fruit in Bangladesh. This manures with pruning factor showed significant effect in case of number of flowers hill^{-1}, length of flower, number of fruits hill^{-1}, flowering to fruit maturity time, fruit weight (g), length of fruit (cm), breath of fruit (cm), pulp weight (g), peel weight (g), TSS of fruit and yield (t ha^{-1}). But further study is needed to determine more precise combination for promising production of dragon fruit.

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Conflict of Interest

There are no competing interests, according to the authors.

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